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ABSTRACT

In the fall semester 1995, Southern Arkansas University- Magnolia (SAU-M) began a two semester trial delivering college classes via a compressed video link between SAU-M and its sister school Southern Arkansas University Tech (SAU-T) in Camden. As soon as the University began broadcasting and receiving classes, it was discovered that using the compressed video as a single medium of delivering distance education is not as effective as was first hoped. As a result of problematic experiences with the trial period of delivering college classes via a compressed video link, the concept of the Electronic Classroom was developed. The Electronic Classroom would include the compressed video unit connected to the University campus network, a fax machine, photocopy machine, high quality speaker telephone, video tape machine attached to the compressed video unit, a microcomputer connected to the network, and a printing electronic white board. The financial strategy of SAU-M will be to fund the large amount of capital needed with grants and fund the day-to-day overhead costs from the normal University budget. The academic strategy will be to receive remedial classes from SAU-T, nursing and medical classes from the Arkansas State Telemedicine Network and possibly graduate programs that SAU-M does not have from another institution. Administrative, academic, procedural, and physical issues that arose are described in detail. (AEF)

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The Compressed Video Experience

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In the fall semester 1995, Southern Arkansas University-Magnolia (SAU-M) began a two semester trial delivering college classes via a compressed video link between SAU-M and our sister school Southern Arkansas University Tech (SAU-T) in Camden. Each compressed video unit manufactured by VTEL Corporation of Austin, Texas (www.timetool.com/) consists of two 25 inch television monitors mounted side by side on a mobile stand, stereo speakers, a user controlled movable camera, a fixed document stand camera, and a number of directional microphones all controlled by a 486 microcomputer processor. The remote classroom is displayed on the left monitor and the home classroom is displayed on the right. The faculty member controls the video unit with a control tablet using a magnetic pen and a computer keyboard connected to the microcomputer processor. Communication between the two compressed video units is by a one-quarter T-1 (384 kilobyte transmission rate) dedicated telephone line. Compressed video is not full motion video like that seen on commercial television. The signal from the sending unit is processed by the microcomputer software into a smaller package and transmitted to the receiving unit where it is processed again into a full picture. As a result of this processing and delays due to traffic on public telephone lines, the picture is occasionally 'jerky' and parts of the audio are lost. This 'jerkiness' does not effect the quality of the reception and within a short period of time viewers learn to ignore these minor interruptions. In extremely rare instances, a sentence or paragraph may have to be repeated.

The two compressed video units, the one-quarter T-1 telephone connection, installation, and maintenance were provided free of charge by Southwestern Bell Telephone for the trial period. SAU-M and SAU-T had only to provide a suitable room and assist with the installation of the units into the institution telephone system. The units were installed at SAU-M and SAU-T in the summer of 1995. Classes taught via compressed video between SAU-M and SAU-T include Unix, intermediate algebra, data structures, maintenance technology, C programming, and elementary school curriculum.

As soon as we began broadcasting and receiving classes, we discovered that using the compressed video as a single medium of delivering distance education is not as effective as was first hoped. As a result of our experiences with this trial period of distance education via compressed video, we developed a concept of an Electronic Classroom. The Electronic Classroom envisioned would include the compressed video unit connected to the University campus network, a fax machine, photocopy machine, high quality speaker telephone, video tape machine attached to the compressed video unit, a microcomputer connected to the University network, and a printing electronic white board. Each student would have access to the internet and have an e-mail account and access to list serve software for a particular class.

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The cost of a suitably equipped compressed video unit is approximately $80,000.00. In addition, the cost of a microcomputer, network connections, fax machine, photocopy machine, speaker telephone, electronic white board, furniture, modifications of the room for better acoustics and lighting, and other support services would increase the total cost of an Electronic Classroom to almost $100,000.00. Telephone line charges will vary widely depending on the tariff rates of local and long distance providers. The cost to SAU-M to establish a permanent T-1 telephone line for compressed video would be approximately $1,200.00 per month. Even though a compressed video connection requires only a one quarter T-1 line, Southwestern Bell Telephone Company will install only a full T-1 line and SAU-M will be required to pay the full T-1 rate. However, since each compressed video unit uses only one-quarter of a T-1, three additional units could be added in the future using the same T-1 line with only a small line charge increase.

As a result of organizing, administering, and delivering these classes, a number of issues arose that were unique to this medium of delivery of education.

Administrative Issues:

Remote registration: Procedures had to be changed so that students could register from either of the remote sites. This included having the necessary forms in each office of the registrar and training registrar staff to be able to help students register for classes at the remote school. The completed forms then had to be forwarded to the opposite school registrar's office.

Tuition, fees, and credits: It was decided that the school that broadcast the course would receive the credits for each student who registered for that class. Also, students would pay the prevailing tuition and fees of the school where the course originated. Where a course was team taught with faculty from both SAU-M and SAU-T students at each site would register with the home school.

Financial aid: Procedures for coordinating student financial aid will have to be developed since the total student course load would be spread between two separate institutions. This was not a problem with SAU-M and SAU-T since we are, technically, the same institution. However, in the future as the compressed video network matures, a full-time student could be taking classes at two or more institutions; even schools located in different states. A great deal of effort will be required to coordinate student financial aid especially Pell awards and student loans.

Articulation agreements, credits, and course numbers: Students must be assured that the classes they are taking via compressed video will transfer between the schools in the video link and to other institutions. Articulation agreements which include prerequisite and corequisite courses, number of credits, course description, course numbers, and course equivalents must be made in advance between participating institutions and publicized for each class.

Grading systems: Grading systems will have to be standardized or agreements that establish grade translations between schools will have to created for compressed

video courses. For example, SAU-T gives only pass/fail grades for intermediate algebra while SAU-M assigns letter grades for the same course. Where there was a difference in a grading, it was decided that students with a majority of hours at SAU-M would receive letter grades and those who had a majority of hours at SAU-T would receive the pass/fail grade.

Advising: Advisors at each school must be informed about the advantages and disadvantages of taking classes by compressed video and of the procedures needed for students to register for these classes. Short training sessions discussing and demonstrating the medium should be scheduled with advisors so they can help students make good decisions whether to take a compressed video class or not.

Credits in escrow: One of the future uses of the compressed video links will be to offer college level or remedial classes to local high schools. A system must be developed with each high school district concerning the credits their high school students may earn.

School calendars and class time schedules: The SAU-M and SAU-T school calendars are different. At the beginning of each semester, SAU-T students attended classes three days before SAU-M students started. Also, there was a difference in the starting times of class meetings. At SAU-T, the classes start at ten minutes after the hour and at SAU-M the classes begin on the hour. Each class that was to meet via compressed video established a starting time convenient with students and faculty. If the compressed video link is to be permanent an agreement must be made to standardize the school calendar and start of class meeting times.

High school class scheduling: Scheduling college classes to be broadcast to local high schools is even more difficult than scheduling classes between colleges. Most college classes do not meet every day; almost all high school classes do. High school class meeting times run to the minute on a strict bell schedule and are far less flexible than college class meeting times which may vary considerably. Also the yearly college calendar has many more days of vacation than the high school calendar.

Books and materials: A method will have to be developed between the bookstores so that books and other required class materials would be available and could be purchased at each site.

Academic Issues:

Faculty training and skill level: Training to competently and confidently use the compressed video unit and the other equipment such as the fax machine, networked PC, and e-mail is critical. To teach well in the Electronic Classroom a faculty member must have the technological skills and confidence to use all of the various electronic devices. The faculty members who have shown the most interest in the medium tend to be those who are most technologically experienced and need only a few hours of training. Others who have less experience with technology will require

many hours of training to be able to effectively handle the equipment and teach well using it.

Communication between faculty and student: Since students and faculty are many miles apart, a new form of faculty office hours is needed. Each student and faculty member should have an e-mail account for direct, fast communication. Also faculty members may wish to moderate an internet list serve for students in each class for additional group discussion outside of regularly scheduled classes. A World Wide Web page could be created also that students could access and faculty could post materials for class use.

Alternating sites: Several faculty have found that alternating sites a few times during the semester, especially at the beginning of the semester, improves the relationship between the faculty member and students at the remote site. Even though students can be seen and heard through the compressed video link, the important personal contact between instructor and student that is missing can be established this way.

Changing instructional paradigms: The manner in which class information is delivered by the faculty member will have to change. Compressed video does not work well broadcasting information delivered by lecture. It does lend itself well to multimedia presentations.

Modification of materials for the medium: Materials used in class such as printed handouts, photographs, video and sound recordings, and computer presentations may have to be modified for use with the compressed video unit. The compressed video unit is designed as a multimedia device, however. The unit is run from a microcomputer processor that can be connected to the University network, a video tape recorder can be included, and video slides can be stored and manipulated electronically. The unit also has a fixed document stand where printed materials can be displayed.

Intellectual ownership of class materials: Classes are video taped as part of disaster recovery in case the connection was lost for a particular class. At issue is who owns the rights to that particular class broadcast, how long will the recording be available, and who will have access to the recording.

Copyrights on materials broadcast: Laws describing limitations and responsibilities of copyrighted material broadcast to a remote site via compressed video are not clear. Since this is a new medium, copyright issues and what constitutes fair use has not been well defined. A reasonable solution will be to use the same parameters used for copying and distributing printed materials until the issue can be clarified.

Release time or additional salary for class preparation: Some faculty who would like to teach via compressed video request either release time or additional salary because of the additional time to learn to use the technology and prepare materials for a class. During this testing period, those who taught compressed video classes volunteered

to do so without extra compensation. This issue is yet not resolved at either SAU-M or SAU-T.

Diction of the instructor: The ability of the instructor to project his or her voice and articulate clearly is essential. Some speakers due to their manner of speaking cannot be easily understood at remote sites because of the quality of the sound transmission. Better acoustics, additional speakers, and the creation of an external sound system improves this situation.

Procedural Issues:

Site coordinator: A site coordinator is needed at each remote site to handle day to day administrative tasks. These would include scheduling the room, booting the video unit, solving minor equipment problems, reporting malfunctioning equipment and assisting students with academic and administrative problems associated with the compressed video class.

Classroom management: Depending on the educational content of the class and demographics of the students, classroom management may be required all or part of the time. Classroom management will including monitoring tests, collecting and distributing assignments and printed material, and communicating with the faculty at the remote site. When broadcasting to a high school location, a classroom manager will have to perform the administrative tasks required of teachers of any class offered at that high school as well as the tasks required by the compressed video format.

Backups in case of line failure: Backup capabilities are required in case of loss of the video link. A video tape recorder can be connected to the compressed video unit to record each class and the tape sent to a site that lost the connection. Also, an excellent quality speaker telephone could be used to establish an audio link if the video link is lost.

Transportation of materials between sites: A process where class materials such as tests, assignments, handouts etc. can be transported between sites in a timely and reliable manner is needed. During the trial period, transportation of documents between sites was done by a faculty member who taught classes at both schools and made three trips per week between SAU-M and SAU-T.

Physical Issues:

Hardware and software maintenance: The success of the electronic classroom will depend upon all of the various electronic devices working at all times. All electronic devices will require periodic maintenance, hardware and software upgrades, and repair at times. Provisions must be made for quality technical support and repair services with quick turn around times. The site coordinator and/or the classroom manager must be able to perform routine maintenance and trouble shooting tasks.

Physical room arrangements: The acoustics of the room are extremely important. Ideally, the room used for compressed video is smaller than the usual classroom, and will need sound absorbing materials such as carpeting, drapes, and ceilings to eliminate echoes. The color of the carpet, walls, and any sound absorbing fabric effects the quality of picture seen at the remote site. Lighter colored pastel shades work well as do neutral colors. Dark and sharply contrasting colors tend to make the picture at the remote site too dark.

Class Size and furniture arrangement: The number of students in the class who can effectively see detail on the video screen is usually 15 or less. Larger groups can be accommodated, but as students sit further away from the screen detail is lost and smaller lettering can't be read. Students sitting in rows in the traditional classroom arrangement does not work well. A better solution is to have tables and chairs in an open space that can be arranged for best viewing depending on the needs of the class.

Scheduling the room: A room must be found that can be dedicated exclusively as an electronic classroom. Some of the classes offered between SAU-M and SAU-T meet only once per week. Canceling the class because the room is needed for some other use is a significant loss of class time.

Summary:

The financial strategy of SAU-M will be to fund the large amount of capital needed with grants and fund the day to day overhead costs from the normal University budget. The academic strategy will be to receive remedial classes from SAU-T, nursing and medical classes from the Arkansas state Telemedicine network and possibly graduate programs that SAU-M does not have from another senior institution. SAU-M will broadcast college credit classes to several local high schools and third and fourth year level courses to SAU-T so that the SAU-T two year students can complete four year degrees.

Instituting a compressed video classroom is enormously expensive, requires substantial administrative coordination between educational institutions, and significant efforts and training on the part of faculty to deliver quality education. In spite of these limitations, compressed video has great potential to deliver and receive educational programs to and from remote sites.